

Section 712. BRIDGE REHABILITATION-CONCRETE

712.01 Description. This work consists of removing concrete and patching or resurfacing with concrete patching or overlay mixtures. This work also consists of removing, replacing, and retrofitting expansion joints and structural concrete portions of existing bridges.

The Contractor may select either silica fume modified concrete (SFMC) or latex modified concrete (LMC) for shallow bridge deck overlay concrete. SFMC is required for deep bridge deck overlay concrete.

712.02 Materials. The materials shall meet the following requirements.

Concrete, Grade S2 and D	701
Mortar and Grout, Type R-1	702
Structures Patching Mixtures	703
SFMC Overlay Mixtures	703
Granular Material, Class II	902
Fine Aggregate 2MS	902
Steel Reinforcement	905
Bar Reinforcement	905
Anchor Bolts	908
Geotextiles	910
Epoxy Resin Adhesive	914
Epoxy Mortar	914
Expansion Anchors	914
Polypropylene Fibers	903
Insulating Blankets	903
Latex Admixtures	903
Water	911
LMC Overlay Mixtures	703

The use of chloride admixtures will not be permitted.

Filler wall concrete shall be Grade S2.

Adhesive anchors, expansion anchors and mechanical reinforcement splices shall be selected from the Qualified Products List. All threaded reinforcing bars used with threaded couplers shall be approved by the manufacturer for use with their product.

Anchor bolts and washers shall be hot-dipped galvanized according to ASTM A 153.

712.03 Construction.

A. Equipment.

1. Equipment for Preparation of Existing Concrete.

- a. **Sawing Equipment.** Sawing equipment shall be capable of sawing the concrete to the specified depth.
- b. **Scarifying Equipment.** The scarifying equipment shall be a power-operated, mechanical scarifier capable of removing the concrete surface to a depth of at least $\frac{1}{4}$ inch for each pass. The equipment shall be equipped with a short ski, shoe, or similar device, attached to the cutter head to limit the depth of cut.
- c. **Blast Cleaning Equipment.** Blast cleaning equipment shall be abrasive or high-pressure water-jet type capable of removing rust scale from reinforcing bars and of removing small chips of concrete partially loosened by the scarifying or chipping operation. For dry abrasive blasting, the abrasive shall be selected from the Qualified Products List.
- d. **Equipment for Removing Concrete on Superstructures.** Prior to the removal of any portion of the bridge superstructure, the Contractor shall have the proposed sequence and method of removal approved by the Engineer. Equipment for removing superstructure concrete shall be subject to the following limitations:

Removing Superstructure Concrete on Steel Beams. Machine-mounted hydraulic or pneumatic equipment may be used on full or partial deck removals, sidewalks, curbs, barriers, and railings.

Removing Superstructure Concrete on Prestressed Concrete I-Beams. Machine-mounted hydraulic or pneumatic equipment may be used in those areas of the bridge deck between the prestressed concrete beams. Manual pneumatic hammers shall be used to remove bridge deck over the prestressed concrete beams. If diaphragms are to be removed, manual pneumatic hammers shall be used to remove the diaphragms. Manual pneumatic hammers shall be limited to 60 pound maximum.

Removing Superstructure Concrete on Prestressed Concrete Spread Box Beams or 1800 Beams. Machine-mounted hydraulic or pneumatic equipment shall not be used on full or partial deck removals. Machine-mounted hydraulic or pneumatic equipment may be used to remove sidewalks, curbs, barriers, and railings. Manual pneumatic hammers shall be used to remove bridge deck over the prestressed concrete beams. If diaphragms are to be removed, manual pneumatic hammers shall be used to remove the diaphragms. Manual pneumatic hammers shall be limited to 60 pound maximum.

Removing Superstructure Concrete on Prestressed Concrete Side-by-Side Box Beams. Machine-mounted hydraulic or pneumatic equipment shall not be used

on full or partial deck removals, or to remove sidewalks, curbs, barriers, and railings that rest directly on the prestressed concrete beams. Machine-mounted hydraulic or pneumatic equipment may be used to remove sidewalks, curbs, barriers, and railings that do not rest directly on the prestressed concrete beams. Hydrodemolishing or manual pneumatic hammers shall be used to remove concrete decks, sidewalks, curbs, barriers, and railings that rest directly on the prestressed concrete beams. Manual pneumatic hammers shall be limited to 60 pound maximum.

Removing Superstructure Concrete at Expansion and Construction Joints.

Machine-mounted hydraulic or pneumatic equipment shall not be used for removing superstructure concrete around expansion or construction joints. Manual pneumatic hammers will be allowed and limited to 60 pound maximum.

2. Equipment For Hydrodemolishing.

- a. **Equipment Description.** The equipment shall operate at a noise level of less than 90 dbA at a distance of 50 feet from the noise source. All water used in hydrodemolishing shall be from a potable water source. The Contractor shall provide shielding of the equipment to prevent injury or damage from flying debris according to subsection 104.10. The Contractor shall be responsible for any injury or damage caused by these operations.
- b. **Equipment Demonstration.** Two trial areas will be designated by the Engineer to demonstrate that the equipment, personnel, and methods of operation are capable of producing results satisfactory to the Engineer.

This demonstration shall follow any scarification required by the plans. The first trial area shall consist of approximately 30 square feet of sound concrete determined by the Engineer. The equipment shall be calibrated to remove the sound concrete to the depth specified on the plans. After completion of this test area, the equipment shall be moved to a second area consisting of deteriorated or defective concrete to determine whether this unsound concrete will be completely removed with the previous calibration.

If the equipment is deemed inadequate for use, the Contractor shall obtain another piece of equipment for a subsequent demonstration. When a satisfactory result is attained, production removal may proceed. No adjustment in the completion date of the project will be made because of delays in obtaining suitable equipment. Recalibration of equipment may be required by the Engineer during production work if concrete is not being adequately removed.

3. **Equipment for Constructing Latex Modified Concrete Surfaces.** Placing and Finishing Equipment. Equipment shall include hand tools for placement and brushing-in freshly mixed concrete mixtures. The finishing machine shall be a self-propelled screed with one or more powered rollers, augers, and vibratory pans set at a vibration rate recommended by the manufacturer. The finishing machine shall be capable of forward and reverse movement under positive control. Provisions shall be made for raising all

screeds to clear the screeded surface for traveling in reverse. Any modifications to the finishing equipment shall be approved by the Engineer.

Screed rails will be required for finishing machines. The wheels shall operate on longitudinal rails capable of carrying the imposed loads between supports with a deflection of not more than $\frac{1}{16}$ inch. The rail sections used shall be straight within $\frac{1}{8}$ inch per 10 feet and the rail grade shall not differ from the required screed grade by more than $\frac{1}{16}$ inch.

The rails shall be attached to the surface so that they can be removed without damage to the new surfacing and so that they can be adjusted vertically. Vibratory equipment will be required for consolidation of hand-finished areas and along all construction joints and bulkheads.

Truss type vibrating screeds will be allowed when conditions (safety, configuration) warrant and when authorized by the Engineer.

4. **Equipment for Cleaning Joints.**

- a. **Air Compressors.** Air compressors shall be portable and capable of furnishing a nozzle pressure of not less than 90 psi. The compressed air shall be free of oil and moisture.
 - b. **Abrasive Blasting Equipment.** Abrasive blasting equipment shall have enough capacity to attain the cleaning specified and shall operate at a nozzle pressure of at least 90 psi. Nozzles shall be of proper diameter in relation to the width of joint and shall be replaced when enlarged by wear.
5. **Equipment for Injecting Adhesive.** The equipment used to inject the adhesive shall be positive displacement type, with fixed ratio, automatic mixing of two components at the nozzle. It shall be equipped with drain-back plugs and a nozzle arrangement which will allow injection of adhesive at a pressure of up to 120 psi without defacing the concrete.
6. **Blast Cleaning Equipment.** Cleaning equipment shall be abrasive blasting or high-pressure water-jet blasting equipment capable of removing all laitance and foreign material including previously applied curing materials and pavement marking paint.

B. **False Decking.** False decking shall be constructed according to subsection 706.03.B.

C. **Superstructure Concrete Removal.** When removing decks, sidewalks, curbs, barriers, and railings, care must be exercised to avoid damage to the concrete and steel portions of the superstructure being retained. Any damage to the portions retained will be repaired at the Contractor's expense.

If any part of the deck is to be incorporated into the new construction, a one inch deep saw cut shall be made on the top and bottom of the deck at the limits of removal.

When sawing is used to section the deck for removal, the depth of the cut shall be less than 90 percent of the full depth over the steel or prestressed concrete beams to avoid cutting the top flange.

Saw cut the front and back vertical steel reinforcement in sidewalks, curbs, barriers, and railings prior to removal.

On prestressed concrete spread box beams and 1800 beams the deck between the beams/girders will be saw cut full depth, parallel to the beams/girders, and removed in sections. Deck over the beams shall be removed using manual pneumatic hammers.

- D. **Removal or Revisions to Bridge Deck Joints.** This work consists of removal or extension and modification of the existing bridge deck joints. All structural steel exposed during concrete removal shall be cleaned using hand tools and coated with aluminum filled epoxy mastic brushed on before recasting concrete.

E. **Scarifying Bridge Decks.**

1. **Scarifying.** After the structure is closed to traffic, the concrete surface to be overlaid shall be scarified to a minimum depth of ¼ inch unless an existing overlay is present. When an existing overlay is present, the overlay shall be scarified to a minimum depth of 2 inches. Areas where the use of the scarifier is not practical shall be removed by hand methods.

No scarifying operations will be permitted within 6 feet of a new overlay until it has had at least 48 hours of curing time.

Vehicular traffic shall be kept off scarified surfaces except for the limited amount required to carry on the work.

2. **Determination of Unsound Concrete.** After the structure has been scarified and cleaned, the Engineer will determine and mark the areas of unsound concrete. In areas of visible deterioration, the Contractor, upon approval from the Engineer, may start hand chipping operations.

- F. **Hand Chipping.** This work consists of the use of hand methods to remove concrete adjacent to exposed reinforcing steel, to remove concrete from deeply spalled areas, to remove unsound concrete from areas marked by the Engineer, to remove epoxy patches, to remove HMA patches, and to remove other unsound material.

No hand chipping operations will be permitted within 6 feet of a new overlay until it has had at least 48 hours of curing time.

Scale or accumulated rust shall be removed from all reinforcing steel by blast cleaning.

1. **Hand Chipping Bridge Deck Concrete.** All unsound concrete and other detrimental material, as determined by the Engineer, in the area to be patched or leveled shall be

removed by use of air chisels, scarifying machines, or by milling. The area to be patched shall then be blast cleaned. Where determined by the Engineer, the area to be patched or filled, on decks which will not be overlaid, shall be saw-cut to a specified line and depth so that the patching mixture will not be feather-edged. Where deep hand chipping is required, the concrete shall be removed to a minimum depth of $\frac{3}{4}$ inch below the exposed steel.

Where the areas to be patched are adjacent to a joint, edge forms shall be installed to the proper grade. Where there is full depth removal of portions of the deck, a false deck of sufficient dimensions shall be provided to protect traffic on the underlying roadway. The false deck shall meet subsection 706.03.B.

All loose material shall be removed and the area cleaned with oil-free compressed air. The sound and cleaned area for patching shall be flushed out with clean water under pressure and the excess water removed by air blasting immediately prior to application of the patching mixture.

All structural steel exposed during concrete removal shall be cleaned using hand tools and coated with aluminum filled epoxy mastic brushed on before recasting concrete.

2. **Hand Chipping Concrete Other Than Deck Concrete.** All unsound or loose concrete shall be removed by air hammers or other approved methods. The area to be patched or filled shall be saw-cut to a minimum edge depth of $\frac{1}{2}$ inch, along a line determined by the Engineer, and the concrete, unsound or sound, shall be removed to a minimum depth of 3 inches measured from the concrete surface. When reinforcing steel is exposed, the concrete, sound or unsound, shall be removed to provide a minimum clearance of $\frac{3}{4}$ inch behind the steel.

All loose material shall be removed and the area blast cleaned and blown out with oil-free compressed air.

Where the areas to be patched are adjacent to a joint, edge forms shall be installed to proper line. The sound and cleaned area for patching shall be flushed out with clean water under pressure immediately prior to application of the patching mixture. Vertical areas shall be prewetted with water after placement of retaining forms and immediately prior to filling. The patch shall be placed according to subsection 712.03.O.

- G. **Hydrodemolition.** This work consists of the removal of deck concrete and concrete patches by means of high pressure water jets. Areas where the use of the hydrodemolisher is not practical shall be removed by hand methods.

All HMA patches shall be removed, and the debris cleaned from the deck, before beginning the first pass of hydrodemolition. Removing HMA patches shall be according to subsection 502.03.C.7. The patches may be removed by hydrodemolition, 30-pound pneumatic hammers, or other equipment approved by the Engineer. If removal of the patches is by hydrodemolition, it shall be by separate passes of the equipment and not combined with the first pass for concrete removal.

Where plans indicate, one pass of the hydrodemolisher shall be made to remove all sound concrete within the limits shown and to the depth specified, along with all deteriorated or defective concrete within these limits. Care shall be exercised to avoid removing sound concrete beyond the specified depth.

Where plans limit hydrodemolishing to only those portions of the deck determined to have unsound concrete, the entire deck shall first be scarified. The Engineer will then mark and measure those areas which are determined to be unsound. One pass of the hydrodemolisher shall be made over these areas with the equipment calibrated as described in subsection 712.03.A.2.b.

Following the first pass, the Engineer will determine and mark any remaining unsound areas of concrete as specified in subsection 712.03.E.2. The unsound areas shall be removed by a second pass of the hydrodemolisher, 60-pound pneumatic hammers or other equipment approved by the Engineer. The calibration of the hydrodemolition equipment shall be the same as the first pass.

Removal of concrete debris shall be by hand or by mechanical means, and shall be accomplished directly following the hydrodemolition process to prevent the debris from re-setting or re-adhering to the surface of the remaining sound concrete. Any debris which is allowed to re-settle or to re-adhere to the surface of sound concrete shall be carefully removed by the Contractor at no additional cost, and the Contractor shall avoid any damage to the remaining sound concrete or exposed reinforcement. Following the removal of debris and prior to the placement of the overlay, the entire surface shall be blast cleaned with abrasive or water to remove all bond-breaking residue, loose material from the concrete surface, and rust from the steel reinforcement.

All structural steel exposed during concrete removal shall be cleaned using hand tools and coated with brush applied aluminum filled epoxy mastic before recasting concrete.

The Contractor shall be responsible for the collection, filtering, and disposal of runoff water generated by the hydrodemolition process. The Contractor shall obtain any required permits and shall comply with applicable regulations concerning disposal of this water. The Contractor also shall make provision for the safe handling of runoff water insofar as it may constitute a physical hazard on the adjacent or underlying traveled roadway surface. The Contractor shall exercise care to protect existing berm slopes from scouring by water jet or runoff water. Runoff water, filtered or unfiltered, shall not be allowed to enter storm sewers, bridge drainage downspouts, or bridge approach downspouts. Runoff water, filtered or unfiltered, shall not be discharged into surface water, floodplain, or wetlands.

- H. **End Header Replacement.** This work consists of removing the end header of a bridge deck and rebuilding the deck and adjacent approach in the area of removal as shown on the plans.
- I. **Exposed Steel Reinforcement.** Scale or accumulated rust shall be removed from all reinforcing steel by blast cleaning. Reinforcement that is broken or missing and those bars that have lost $\frac{1}{4}$ or more of their original diameter shall be supplemented by splicing in new bars with a lap length of 35 bar diameters or as directed by the Engineer. Where the bond

between existing concrete and reinforcing steel has been destroyed, the concrete adjacent to the bar shall be removed to a minimum depth of $\frac{3}{4}$ inch, except in the case of a bridge deck where lower bar mats make this impractical. Exposed reinforcing steel shall not be displaced or damaged. All exposed waterstops shall be removed. Reinforcing steel shall be adjusted to provide the amount of cover specified on the plans.

All exposed untied reinforcing bar laps and intersections shall be securely wire tied as follows:

1. **Bar Laps.** All bar laps shall be securely tied in at least two locations at the overlaps. Where sound concrete bonded to the reinforcing bar prohibits tying bar laps, the sound concrete shall be removed only to the extent necessary to permit the bars to be securely tied.
 2. **Bar Intersections.** Bar intersections shall be tied at each third intersection location. Where sound concrete bonded to the reinforcing bar prohibits tying the bar intersection, or it is impractical to securely tie the third intersection, then the next nearest accessible intersection shall be tied. Sound concrete bonded to the reinforcing bar need not be removed to permit the tying of bar intersections.
- J. **Anchoring Reinforcing Bars or Bolts with Adhesive.** This work consists of drilling holes of the proper size and depth, removing all unsound concrete and dust, filling the drilled holes with adhesive, and installing reinforcing bars or bolts. Adhesive anchor systems shall be selected from the Qualified Products List.

The temperature of the concrete and steel shall be at least 50 °F and rising at the time of placing the adhesive. If artificial heat is used to warm the concrete and the bars or bolts, the concrete and steel surfaces to be in contact with the adhesive shall be kept free of contamination and shall not be heated above 180 °F.

1. **Anchoring Bars or Bolts.** The Contractor shall propose for the Engineer's approval, complete details of the drilling, cleaning, and bonding systems to be used for anchoring the reinforcement. Prior to use, the proposed systems shall be proof tested by the Engineer. A minimum of three proof test anchors shall be prepared by the Contractor in the position to be used, on a separate concrete block, and in the presence of the Engineer. The tests of the proposed systems shall consistently demonstrate that 125 percent of the anchored bars yield strength can be developed in pull-out tests and that the bars shall be bonded to the concrete a minimum of 90 percent of the embedded bar length and circumferential area. Bar slippage at yield strength shall not average more than $\frac{1}{16}$ inch.

No drilling method will be approved that has the potential to cut or damage existing reinforcing steel. The Contractor shall accurately locate the steel reinforcement by the use of a pachometer or other approved means prior to drilling the hole. All loose concrete, dust, dirt, and oil shall be removed from the holes by flushing with water under pressure and mechanical agitation. The holes shall be blown out with oil-free compressed air and shall be dry before installation of the adhesive.

The reinforcing steel shall be cleaned of all loose scale, rust, oil, and dirt by an appropriate method and shall be dry before installation. The manufacturer's directions shall be followed when preparing the adhesive for installation in the hole. Sufficient adhesive shall be placed in the hole to completely fill the space between bar and hole surface for the entire depth.

2. **Field Testing.** The Contractor shall conduct field testing during the first day of production at three locations specified by the Engineer. Testing shall be witnessed by the Engineer. The pull-out test shall demonstrate that 90 percent of the bar's yield strength develops with less than $\frac{1}{16}$ inch slip. The Engineer may conduct random pull-out tests for acceptance. Acceptance tests must equal 90 percent of the bar's yield strength with less than $\frac{1}{16}$ inch slip. The Contractor shall repair damage to epoxy coating. The Contractor shall use a tension testing device according to ASTM E 488. The Contractor shall provide a copy of a certified calibration for the load testing device. The calibration shall be updated annually.

- K. **Mechanical Expansion Anchored Bolts.** This work consists of drilling holes of the proper size and depth, removing all unsound concrete and dust, and installing mechanical expansion anchors. No drilling method will be approved that has the potential to cut or damage existing reinforcing steel. The Contractor shall accurately locate the steel reinforcement by the use of a pachometer or other approved means prior to drilling the hole. Mechanical expansion anchors shall be selected from the Qualified Products List.

1. **Anchoring Bolts.** The Contractor shall provide to the Engineer the manufacturer's product data sheet and installation procedure for the anchor. The product data sheet shall show the ultimate load of the anchor at the given embedment depth. The hole shall be blown out with oil-free compressed air, brushed, and blown out again. Elongated holes will not be accepted. Prior to use, the proposed anchor shall be proof tested by the Engineer. The proof test shall be prepared by the Contractor on a separate concrete block or shall be prepared on the structure by the Contractor in a location approved by the Engineer. The test shall demonstrate that the anchors will develop the following proof tensile (pullout) load:

Diameter(Inches)	Load (Pounds)
$\frac{3}{8}$	3,500
$\frac{1}{2}$	6,400
$\frac{5}{8}$	10,200
$\frac{3}{4}$	15,000
$\frac{7}{8}$	20,800

2. **Field Testing.** The Contractor shall conduct field testing during the first day of production at three locations specified by the Engineer. Testing shall be witnessed by the Engineer. The field test shall demonstrate that the anchor will provide a minimum pull-out resistance of 50 percent of the proof tensile load at $\frac{1}{16}$ inch slippage. The Engineer may conduct random pullout tests, at 50 percent of the proof tensile load, for acceptance.

The Contractor shall use a tension testing device according to ASTM E 488. The Contractor shall provide a copy of a certified calibration for the load testing device. The calibration shall be updated annually.

L. **Mechanical Reinforcement Splicing.**

1. **Preparation of Bar Ends.** Bars to be spliced may be sawed or sheared provided that ends of sheared bars are straightened after shearing. All surfaces to be coupled shall be free of burrs, paint, oil, rust, scale, or other foreign material and shall be cleaned by wire brushing, abrasive blasting, or other approved method just prior to splicing.

Cleaning shall extend 2 inches beyond sleeve location. All bar end surface preparation shall be inspected and approved prior to installation.

2. **Installation.** The Contractor shall follow the manufacturer's installation procedure. The installation procedure, including all applicable manufacturer's approvals, shall be submitted to the Engineer for review prior to beginning the splicing operation.

When the steel reinforcement to be spliced is epoxy coated, the mechanical reinforcement splices shall be epoxy coated according to AASHTO M 284. If the installation procedure will not destroy a pre-applied epoxy coating, the splices shall be purchased with the epoxy coating. After installation, all exposed surfaces of the mechanical reinforcement splices and the attached reinforcing steel, including damaged coatings and exposed threads, shall be epoxy coated according to subsection 706.03.E.8.

If threaded couplers are used, the threads shall be protected by plastic internal coupler protectors or other methods approved by the manufacturer. The threads on the reinforcing bars shall be protected by plastic bar end protectors or other methods. If flanged or unsymmetrical couplers are used, the coupler shall be oriented so as to infringe upon the required clear cover as little as possible.

3. **Testing.** For swaged splices, the Contractor shall make five test splices on the smallest and five test splices on the largest bar sizes that are to be spliced. The test splicing shall be witnessed by the Engineer. These tests shall be used to establish a splicing procedure to be followed in the work. For other types of splices, The Contractor shall provide two test splices on the smallest and two test splices on the largest bar sizes that are to be splices. Splices shall develop a tensile strength of 125 percent of the bar's yield strength. For all required tests, sample bars shall each be 12 inches long and supplied by the Contractor. If existing reinforcing steel that is being spliced has an inferior or badly corroded exterior deformation pattern, the Engineer may require additional qualification testing on these bars to demonstrate the coupler strength on the actual job bars. All test splices shall be tested by the Department.

- M. **Forming in Areas of Full-Depth Removal.** In areas of full depth removal, forms shall be provided to enable placement of the concrete mixture. These forms may be suspended from existing reinforcing bars by wire ties, when approved by the Engineer. In the case of large area openings, forms shall be supported by blocking from the beam flanges. All forms shall be removed upon completion of the work.

- N. **Protection and Cleaning of Deck Areas to be Overlaid.** Areas from which unsound concrete and patches have been removed shall be kept free of slurry produced by wet sawing or wet scarifying by planning the work so that this slurry will drain away from the completed areas. Slurry shall be removed from prepared areas before resurfacing.

Prior to placement of the overlay, the deck and the edges of previously placed overlay shall be blast cleaned with abrasive or water under high pressure to expose the coarse aggregate and obtain a sound surface for bonding the overlay to the deck surface. Where abrasive blasting operations cause a dust problem, as determined by the Engineer, the Contractor shall take measures to control the dust; such measures include the use of a cleaner abrasive or switching to the use of water-blasting equipment.

The final deck preparation shall be completed sufficiently in advance of the overlay placement operations to allow the Engineer time to inspect the condition of the deck. The prepared surfaces shall not be opened to traffic prior to placement of the overlay.

The deck surface shall be clean and thoroughly wetted one hour prior to placement of the overlay mixture and kept damp throughout the pour. Any standing water in depressions, holes, or areas of concrete removal shall be blown out with oil-free compressed air.

- O. **Mixing, Placing, Finishing, and Curing Concrete Patches.** The patching mixture shall be machine mixed using equipment specified in subsection 703.03.B and furnished in quantities which can be placed and finished before initial set.

The old concrete shall be moist, with no free water on the surface, at the time of priming and placement of patching mixture.

For patches on bridge decks, the repair area shall be primed with a grout or slurry, applied with a stiff bristle brush, and broomed into the surface, immediately prior to filling the holes with the patching mixture. For regular patching mixtures, prime with a Type R-1 grout. For latex modified concrete mixes, use a slurry consisting of 50 percent latex admixture and 50 percent water with sufficient cement added to produce a brushable paste. If the grout or slurry bond coat dries prior to placing the patching mixture, it shall be removed by blast cleaning and reapplied prior to placement of the patching mixture. The patching mixture shall be immediately placed into the primed area, uniformly vibrated, and finished with a wood float. After finishing, the patched surface shall be textured to give a uniformly roughened surface.

For patches on surfaces other than decks, the concrete shall be placed and properly consolidated. The Engineer may require the use of small hand vibrators or the vibration of the forms.

Immediately after final finishing, the patched areas shall be covered with sheet curing materials or wet burlap and remain covered until the concrete attains a flexural strength of 550 psi, but not less than five days for regular strength patching mixtures nor less than 24 hours for high-early-strength patching mixtures. If temperatures fall below 50 °F, the Engineer may require additional curing time to ensure that the concrete attains the 550 psi strength.

Forms left in place for five days is an acceptable method of curing. If concrete repair is done in cold weather, the cold weather protection requirements of subsection 706.03.J shall apply.

When air temperature is greater than 80 °F, wetted burlap shall be used and kept continually moist for a minimum of two days. For regular strength patching mixtures, sheet

plastic or paper curing material may be used for the remaining three days. No membrane curing compounds will be permitted.

No additional concrete shall be placed on freshly placed substructure concrete until the substructure concrete has been properly cured for at least three days or has attained at least 70 percent of its minimum 28-day flexural or compressive strength according to subsection 701.03.G and Table 701-1. Mechanical attachment to freshly placed substructure concrete shall not be used to support forms until the substructure concrete has attained at least 70 percent of its minimum 28-day flexural or compressive strength according to subsection 701.03.G and Table 701-1. The Engineer will lower the required concrete strength provided the Contractor submits acceptable engineering calculations showing that the imposed loads will not exceed 70 percent of the newly placed concrete strength. The Contractor shall verify the existing concrete strength by testing at least two beams or cylinders cured in the same environment as the concrete items they represent. The testing shall be done on the project site and shall be witnessed by the Engineer.

- P. Mixing, Placing, Finishing and Curing Latex Modified Concrete Overlay Mixtures.** Equipment will not be permitted over patches until the patches have attained a flexural strength of at least 550 psi.

Expansion joints and dams shall be formed through the overlayment. A bulkhead shall be installed to the required grade and profile prior to placing the concrete mixture. Casting full depth across the joint will not be allowed.

Screed rails shall be placed and fastened in position to ensure finishing the new surface to the required profile. Anchorage for supporting rails shall provide horizontal and vertical stability. Screed rails shall not be treated with parting compound to facilitate their removal.

The requirements for texturing and finishing the deck surface to the required tolerances are as specified in subsections 706.03.M.3 and 4.

Mixers shall be clean and the ingredients shall be accurately proportioned and mixed at the project site. The concrete discharged from the mixer shall be uniform in composition and consistency. Mixing capability shall be such that finishing operations can proceed at a steady pace with final finishing completed before the formation of the plastic surface film. An initial layer of mixture shall be brushed onto the wetted, prepared surface ensuring that all vertical and horizontal surfaces receive a thorough, even coating. Limit the rate of progress so that the brushed material does not become dry before it is covered with overlay material required for the final grade. Material used for brushing which has had the mortar used up, shall not be used.

The mixture shall be placed a minimum of ¼ inch above final grade. It shall be consolidated and finished at final grade. Hand finishing with a float may be required along the edge of the pour or on small areas. If necessary, a small amount of latex grout may be used as an aid to hand floating. Edge tooling is required at joints, except next to metal expansion dams, curbs, previously placed lanes, and edges to be sawed. Minor irregularities shall be removed by grinding.

After the mixture has stiffened sufficiently, screed rails and construction bulkheads shall be separated from the newly placed material by passing a pointing trowel along their inside

face. Care shall be exercised to ensure that this trowel cut is made for the entire depth and length of rails. Metal expansion dams shall not be separated from the overlayment.

The surface shall be covered with a single layer of clean, wet burlap as soon as the surface will support it without deformation.

Within one hour of covering with wet burlap, a layer of 4-mil minimum polyethylene film shall be placed on the wet burlap and the surface wet cured for 48 hours. With the approval of the Engineer, burlap-polyethylene sheets may be substituted for the polyethylene film but shall not replace the initial curing with wet burlap. The polyethylene side shall be placed down, against the wet burlap.

At the end of the 48-hour wet-cure period, the curing material shall be removed and the surface allowed to air cure for an additional 48-hour period. The curing water runoff shall not be discharged into surface water.

- Q. Mixing, Placing, Finishing, and Curing SFMC Concrete Overlays.** Equipment will not be permitted over patches until the patches have attained a flexural strength of at least 550 psi.

Expansion joints and dams shall be formed through the overlayment. A bulkhead shall be installed to the required grade and profile prior to placing the concrete mixture. Casting full depth across the joint will not be allowed.

Screed rails shall be placed and fastened in position to ensure finishing the new surface to the required profile. Anchorage for supporting rails shall provide horizontal and vertical stability. Screed rails shall not be treated with parting compound to facilitate their removal.

The Contractor will appoint a technical representative capable of making adjustments to the batching and mixing of SFMC. The technical representative will designate a batching sequence of SFMC materials to ensure uniform distribution of all materials throughout the concrete mixture. The technical representative will be present at the trial batch and at the first day of SFMC placement to make recommendations and adjustments to the mixture.

A four cubic yard trial batch is to be mixed and placed, at the batch plant, or at the project site as designated by the Engineer, a minimum of three working days prior to full production. The Contractor shall notify the Engineer of the time and location of the trial batch a minimum of twenty four hours prior to batching.

The trial batch will be proportioned according to the adjusted mix design using the same materials that will be used in the deck overlay mixture. For the trial batch to be considered successful, the slump must be within one inch of the specified range, and the air content must be within 1.0 percent of the specified range. If the trial batch does not meet these requirements, the trial batch shall be discarded and the batching repeated. The cost of additional trial batches will be borne by the Contractor.

The requirements for texturing the deck surface and for finishing the deck surface to the required tolerances are as specified in subsections 706.03.M.3 and 4.

Proportioning and mixing SFMC shall be by either a ready mixed or central mixed batch plant meeting the requirements of subsection 701.03. Trucks delivering SFMC to the project site must be fully discharged within one hour of charging at the plant.

One hour prior to placing the SFMC overlay, the prepared deck will be wetted with a uniform spray application of water. Water collecting in depressions will be blown out with clean, oil free, compressed air.

SFMC mixture placed in localized areas deeper than 3 inches is to be hand vibrated in front of the finishing machine by drawing a probe vibrator horizontally through the concrete parallel to the transverse reinforcing bars at intervals not greater than 18 inches on center. Should the operator have trouble locating the deep removal areas, the Contractor will devise a system for use such as a deck diagram or markings on the barriers. The Contractor will coordinate this system with the Engineer.

A continuous fog spray of water will be applied to the screeded and finished concrete to prevent net evaporation from the surface of the unhardened concrete. Fogging equipment will be capable of placing a fine mist over the concrete surface without ponding water. Fogging will continue behind the final floating operation until the wet cure system is in place and activated. Fogging shall not be used to apply water to the surface of the concrete to facilitate finishing.

The curing procedure shall consist of covering the concrete surface with clean, contaminant-free wet burlap as soon as the concrete surface will support it without deformation, but not more than two hours after the concrete was cast. The burlap to be used for wet-cure shall be soaked in clean water for a minimum of 12 hours immediately prior to commencement of concreting operations. Prior to its use, the burlap sheeting shall be draped or suspended vertically for sufficient time to remove any excess water that may dilute or damage the fresh concrete, however, the burlap shall not be permitted to dry.

Once in place, the burlap shall also not be permitted to dry. Burlene or other similar products with impervious surfaces are not permitted. A network of soaker hoses shall be installed over the wet burlap as soon as the concrete surface will support it without deformation. Soaker hoses shall be perforated throughout their length, within the limits of curing, and shall be capable of discharging sufficient water to uniformly and continuously cover the entire bridge deck surface without having to be periodically relocated. Perforations shall be sized so as to prevent excessive localized discharge of water which may damage the concrete surface. Non-perforated hose shall be used outside the limits of the bridge deck curing.

The Contractor shall demonstrate to the Engineer that the soaker hose system provides uniform and thorough coverage of the entire deck surface. A continuous layer of 4-mil polyethylene film (transparent or white color) shall then be securely placed over the entire deck surface and the soaker hose system. All seams shall overlap 10 inches minimum. The water supply, meeting the requirements of section 911, shall then be activated and maintained to ensure complete and uninterrupted wet curing of the entire deck surface for the remainder of the first seven days following concrete placement. The Contractor shall control the water runoff so as not to cause traffic hazard or soil erosion problems. The curing water runoff shall not be discharged into surface waters.

The wet curing system shall not be removed until the Contractor receives approval from the Engineer. Compressive strength test results meeting or exceeding the seven-day strength specified in Table 701-1 will not be basis for removal of the wet curing system prior to the minimum seven day wet cure period.

Sidewalk, curb, or barrier shall not be cast on the deck overlay until the overlay concrete has received its continuous seven-day wet cure. Heavy equipment will not be permitted on the deck overlay until the overlay concrete has reached an age of at least seven days, and then not until the concrete has attained the 28-day strength listed in Table 701-1.

- R. **Cold Weather Limitations for Placing SFMC or LMC Overlay Mixtures.** Overlay mixtures may be placed when the air temperature and concrete substrate are at least 40 °F and rising, and the predicted air temperature during the curing period will be above 35 °F. The use of insulating blankets is required when the air temperature during the curing period is predicted to fall below 45 °F. Insulating blankets shall remain in place for the duration of the wet curing period and shall have a minimum overlap of 12 inches. The insulating blankets shall be placed on top of the wet curing system for the bridge deck overlay concrete.

If the air temperature is predicted to fall below the 45 °F during the remainder of the curing period, beams shall be made from each day's pour to enable the Engineer to determine when the concrete overlay has attained a flexural strength of at least 550 psi in addition to the completion of the full curing period.

Approval will be based on evaluation of the Contractor's ability to complete all overlays, HMA work, and other work within specified temperatures and in a timely manner. No LMC or SFMC concrete shall be placed after November 1.

- S. **Hot Weather Limitations for Placing Overlay Mixtures.** Concrete overlay mixtures may be cast when the combination of air temperature, overlay concrete temperature, relative humidity, and wind velocity at the site are such that the rate of evaporation does not exceed 0.15 pounds per square foot per hour, as determined from Table 706-1. No overlay concrete shall be cast when the air temperature exceeds 85 °F. The Contractor shall supply approved equipment for determining the relative humidity and wind velocity at the site.
- T. **Construction Limitations for Placing Overlay Mixtures.** For delays of one hour or less, the end of the concrete just placed shall be protected from drying with several layers of wet burlap.

For delays exceeding one hour, a construction dam or bulkhead shall be installed. If the problem is shortly resolved and the Contractor desires to resume placement of the overlay, a 3-foot gap shall be left and placement operations resumed. The gap shall be blast cleaned and cast the next working day.

Adequate precautions shall be taken to protect freshly placed concrete from sudden or unexpected rain, as determined by the Engineer. All placing operations shall stop when it starts to rain. The Engineer may order removal of all material damaged by rainfall.

For LMC overlays, all traffic shall be kept off the surface for at least 96 hours after placement. At temperatures below 55 °F, the Engineer may require additional dry curing.

For SFMC overlays, sidewalk, curb, or barrier shall not be cast on the deck overlay until after the continuous 7-day wet cure is complete. Heavy equipment will not be permitted on the deck overlay until the overlay concrete has reached an age of at least 7 days and then not until the concrete has attained the 28 day strength listed in Table 701-1.

Screed rails may be removed at any time after the concrete has taken initial set. Adequate precaution shall be taken during screed rail removal to protect the edge of the new surface from damage.

No scarifying, hydrodemolition, or chipping operations will be permitted within 6 feet of newly placed overlays until they have cured for at least 48 hours. These limitations shall also apply to areas of the completed overlay needing repair for such purposes as cutting out footprints, etc. Areas of overlay to be repaired shall be outlined with saw cuts extending to the depth of the overlay prior to removal and repair.

U. Repairing Cracks by Pressure Injection. The cracks to be repaired shall be shown on the plans or directed by the Engineer.

1. **Preparation of Cracked Surfaces.** All cracks to be repaired shall be cleaned of any leaching deposits by abrasive blasting or approved wire brushing, as directed by the Engineer. The entry ports for the adhesive shall be spaced so that material will travel between ports. The spacing shall be greater than the estimated depth of the crack. The temporary seal shall be applied along the clean and dry crack. The temporary seal with entry ports for adhesive shall be applied in such a manner that the surface of the concrete will not be defaced and the seal shall be capable of containing the pumped adhesive. After the temporary seal and entry ports are in place, further cleaning and flushing required by the Engineer will be paid for separately.
2. **Flushing Cracks.** If directed by the Engineer, flushing cracks with water shall be done by pressure washing through the ports provided for injection. The water flushing shall wash out all the concrete laitance or contaminants in the crack. Air shall be blown through the cracks, after flushing, to remove free water.
3. **Temperature Limitations for Injection.** Concrete and surrounding air temperatures shall be at least 50 °F before any injection work may begin. Lower injection temperatures may be approved by the Engineer based on the adhesive material manufacturer's recommendations.
4. **Injection of Cracks.** Injection shall begin at the lower entry port and continue until there is evidence of adhesive at the port directly above or adjacent to the port being pumped. The injection shall then be discontinued on the port being pumped and the port shall be sealed. The injector shall be transferred to the next port and injection shall be continued until the crack is completely filled. Injection shall be done from both sides of a cracked member, if necessary, to complete the crack injection. Leakage of the adhesive from the crack after injection is completed shall be prevented.
5. **Adhesive Cure and Removal of Temporary Seal.** Upon completion of the injection of the cracks, the adhesive shall be allowed to cure at or above 50 °F minimum, the minimum cure time recommended by the manufacturer. The seal shall then be removed or ground flush with the concrete surface. The temporary seal may be left in place for injected areas not exposed to view, as determined by the Engineer.

The areas repaired by injection shall be cleaned of all surface contamination caused by the injection.

V. **Water Repellent Treatment.** Where penetrating water repellent treatment is called for on the plans, it shall be applied according to subsection 706.03.S.

W. **Cleaning and Coating Exposed Steel.** Clean and coat areas of visible rust, rust breakthrough, and blistered, peeling or scaling paint as identified by the Engineer. All cleaning shall be done with hand tools. Coating shall be aluminum filled epoxy mastic and shall be applied by brush. The following surfaces shall be inspected by the Engineer to determine if cleaning and coating is necessary.

1. If the entire deck above steel beams is removed, the top and edges of the top flanges, and the beam ends, shall be inspected, cleaned and coated prior to recasting the concrete deck.
2. If metal deck forms are used, edges of top flanges shall be inspected, cleaned and coated prior to installing the form.
3. All metal surfaces exposed during the removal of any portion of the backwall or in conjunction with full deck removal shall be inspected, cleaned and coated.

X. **Grouting Under Masonry Plates.** The Contractor shall propose a material and a placement procedure for the Engineer's approval. The Contractor shall then demonstrate by means of a full scale test, that the procedure for the placement of the grout materials will lead to 90 percent surface area contact, based on the contact areas of the masonry plate and concrete surface.

The concrete beneath the grouted area shall have achieved its required compressive strength prior to beginning the grouting operation.

The space to be grouted shall be formed, the surfaces cleaned, and the grout mixed, placed, and cured according to the manufacturer's recommendations.

After sufficient curing of the grout, the forming material shall be removed to permit inspection of the grouted space. Load shall not be applied to the grout until it has cured according to the manufacturer's recommendations.

712.04 Measurement and Payment.

Contract Item (Pay Item)	Pay Unit
Scarifying	Square Yard
Latex Conc Surface, Rem	Square Yard
Hand Chipping, Shallow	Square Yard
Hand Chipping, Deep	Square Yard
Hand Chipping, Other Than Deck	Cubic Foot
Hydrodemolition, First Pass	Square Yard
Hydrodemolition, Second Pass	Square Yard
Structures, Rehabilitation, Rem Portions	Lump Sum
End Header Replacement	Foot
Deck Joint, Rem	Foot

Bridge Joint, Revise Expansion Device	Each
Bridge Joint, Revise Compression Seal	Each
Adhesive Anchoring of Vertical Bar, — inch	Each
Adhesive Anchoring of Horizontal Bar, — inch	Each
Bolt, Adhesive Anchored, — inch	Each
Bolt, Mechanical Expansion Anchored, — inch	Each
Reinforcement, Mechanical Splice	Each
Patch, Full Depth	Cubic Yard
Patching Mortar or Conc	Cubic Foot, Cubic Yard
Patching Conc, —	Cubic Yard
Patch, Forming	Square Foot
Bridge Joints, Clean and Seal	Lump Sum
Flushing Cracks, Water	Foot
Structural Crack, Repr	Foot
Filler Wall Conc	Cubic Yard
Top Flanges and Beam Ends, Clean and Coat	Square Yard
Bridge Deck Surface Construction	Square Yard
Conc, Silica Fume Modified	Cubic Yard
Conc, Bridge Deck Overlay	Cubic Yard
Masonry Plate, Grout	Each

- A. **Scarifying** will be measured for those areas required to be scarified to a depth of 1/4 inch. When required by the Engineer to scarify additional areas to correct the grade, such areas will be measured for each pass of 1/4 inch depth of scarifying equipment required to remove the material.
- B. **Latex Conc Surface, Rem** is based on the removal of the entire latex modified concrete bridge deck surface up to a maximum depth of 2 inches.
- C. **Hand Chipping.**
1. **Hand Chipping, Shallow** will be measured for the areas marked by the Engineer. The work of **Hand Chipping, Shallow** applies to locations where bridge deck concrete is removed from the surface down to the midpoint of the top bar of the top mat of the steel reinforcement. The work includes blast cleaning the steel reinforcement and all the work specified for preparing the area for patching.
 2. **Hand Chipping, Deep** will be measured by area for the areas marked by the Engineer. The work of **Hand Chipping, Deep** applies to locations where bridge deck concrete removed exposes steel reinforcement and includes the removal of all concrete from the surface to the bottom limits required to be chipped; this distance will not be less than the distance from the surface to 3/4 inch below the bottom of the exposed steel. The work includes blast cleaning the steel reinforcement and all the work specified for preparing the area for patching.
 3. **Hand Chipping, Other Than Deck** will be measured for the areas marked by the Engineer. **Hand Chipping, Other Than Deck** applies to locations other than top surfaces of decks where concrete is removed regardless of depth. The work includes blast cleaning the steel reinforcement and all the work specified for preparing the area for patching.

4. **Hydrodemolition.** Concrete removed during the successful hydro-demolition equipment demonstration will be paid for as **Hydrodemolition, First Pass**. Hand chipping required to remove concrete below reinforcement shall be included in **Hydrodemolition, Second Pass**. The work of **Hydrodemolition, First Pass** includes all costs associated with tying exposed steel reinforcement. **HMA Patches, Remove** will be paid according to subsection 502.04.

D. Reinforcing.

1. Reinforcement, Steel will be measured and paid for as specified in subsection 706.04. Dual bars of equivalent section will be measured as though they were the required size.

The item of Reinforcement, Steel includes furnishing and splicing in the new bars to replace corroded bars or bars removed by others. Reinforcement used to replace bars damaged by the Contractor's operations shall be replaced at the Contractor's expense.

2. **Adhesive Anchoring of Vertical Bar** and **Adhesive Anchoring of Horizontal Bar** includes furnishing the adhesive, drilling and cleaning the hole, filling the hole with adhesive, and installing the bar. The cost of furnishing the reinforcing bar is included in the quantity computed for Reinforcement, Steel. Each end of a bar that is required to be anchored will be paid for as a separate unit (the number of units paid for equals the number of holes drilled). Payment for both **Adhesive Anchoring of Vertical Bar** and **Adhesive Anchoring of Horizontal Bar** will include testing.

3. **Reinforcement, Mechanical Splice** includes preparation of test samples, preparing the steel reinforcement for a splice, installing the coupler, and applying an epoxy coating. The mechanical reinforcement splices shown on the plans will be measured and paid by the unit. If the length of the coupler is increased from the standard length to compensate for inferior deformations on the existing bars, the unit price will be increased on a pro-rated basis on the length of the increase in inches. Payment for the threaded reinforcing bars used with threaded couplers shall be included in the contract items **Steel Reinforcement** or **Steel Reinforcement, Epoxy Coated**.

- E. **Bolt, Adhesive Anchored** includes furnishing the bolt and the adhesive, drilling and cleaning the hole, filling the hole with adhesive, and installing the bolt. Payment for both **Bolt, Adhesive Anchored** and **Bolt, Mechanical Expansion Anchored** will include testing.

- F. **Structures, Rehabilitation, Rem Portions** will include all saw cuts required for removal.

- G. **End Header Replacement** will be measured by the foot and includes removing and replacing the end header, deck, backwall, and approach pavement as detailed on the plans.

- H. The pay quantity for **Structural Crack, Repair** will be the length of crack injected, measuring the crack along one surface only. Payment for the work of **Structural Crack, Repair** includes preparing the cracks, installing temporary seals and ports, furnishing and injecting the epoxy adhesive, removing the temporary seals, and cleaning up the finished surface completely.

- I. **Deck Joint, Rem** will be measured by the foot and will include expansion joint, construction joint removal, and cleaning and coating of exposed steel. The pay limits will be shown on the plans. Removal required beyond the pay limits will be paid for as extra work.

Bridge Joint, Revise Expansion Device and **Bridge Joint, Revise Compression Seal** will be measured as each. Each end of the joint will be measured separately.

- J. **Patching. Patch, Full Depth** will be measured by volume of the hole to be filled. When the patch is filled as a separate operation from the overlay mixture, the work will be paid for as **Patch, Full Depth**, regardless of the type of mortar or concrete used to fill the patch. Payment for **Patch, Full Depth** includes furnishing, placing, consolidating, finishing, and curing the patching mixture. When full depth patches are cast as an integral part of the overlay, the quantity of concrete material required to fill the full depth patches will be included in the quantity of surfacing mixture required and will be paid for as **Conc, Bridge Deck Overlay**. Where placement of full depth patches requires forming from the underside of the deck, the work involved in the cleaning and coating structural steel, forming, form removal, and cleanup will be paid for as extra work; this work does not include the forming required for joint replacement. If maintenance of traffic is required underneath the structure due to the work required to repair the full-depth patch, it will be paid for as extra work.

The repair of concrete with mortar or concrete patching mixtures, regardless of the type of mortar or concrete used, will be measured by volume of **Patching Mortar or Conc** or **Patching Conc** placed. The work includes furnishing, mixing, placing, vibrating, finishing and curing. When the pay item **Patching Conc** is used, the grade or type of patching material will be specified.

Patch, Forming includes the cost of the forming required to retain the patching material. Measurement for purposes of payment will be based on the area of concrete removed. The work applies to areas where forming is required, on other than full-depth patches, on bridge decks.

K. **Bridge Decks**

1. **Bridge Deck Surface Construction** will be measured within the limits shown on the plans, including expansion devices and drain castings according to subsection 706.04. The item **Bridge Deck Surface Construction** includes blast cleaning the deck, and consolidating, finishing, texturing, and curing the surfacing mixture.
2. **Conc, Silica Fume Modified** includes furnishing and placing the overlay concrete on the prepared deck substrate within the limits shown on the plans. The quantity will be documented, measured and paid for using batch plant tickets with deductions made for material wasted or rejected. The initial trial batch will be included in this quantity. Any additional trial batch necessary to adjust the mix will be prepared at no additional cost to the Department. If insulating blankets are required, they shall be considered included in payment for this item.
3. **Conc, Bridge Deck Overlay** includes furnishing, placing the overlay concrete on the prepared deck substrate within the limits shown on the plans. The quantity of silica fume modified concrete will be documented, measured, and paid for using batch plant tickets with reductions made for material wasted or rejected. The initial trial batch will

be included in this quantity. Any trial batch necessary to adjust the mix will be prepared at no additional cost to the department.

The quantity of latex modified concrete mixture (LMC) will be measured by volume of surfacing mixture used for the partial-depth patching and overlay. The quantity will be determined from the theoretical yield of the design mix and documented by the ticket printout of the cement used and yield tests performed. Deductions will be made for material wasted or rejected. The work includes furnishing and placing the surfacing mixture and furnishing and placing the grout or bond coat material. If insulating blankets are required they shall be considered included in payment for this item.

- L. **Top Flanges and Beam Ends, Clean and Coat** will be measured and paid for within the limits shown on the plans or as determined by the Engineer. This work includes cleaning and coating these areas.
- M. **Filler Wall Conc** will be based on plan quantities. Payment for **Filler Wall Conc** includes forming the wall with weepholes, forming the footing with drain holes, and the furnishing, placing, finishing, and curing of the concrete for filler-walls, footings, and filler wall extensions. It also includes furnishing and placing expansion joint filler, granular material Class II and 4-inch concrete slab where required between walls, and geotextile covering of drain holes.